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REMARKS

Disposition of Claims

Upon entry of the foregoing amendments, claims 6-9 and 11-15 will remain pending in the application and stand ready for further action on the merits. Claims 1-5 have been canceled without prejudice or disclaimer of the subject matter contained therein. Claim 8 has been amended to further clarify that the polymeric web contains at least one molded article and the optical system distinguishes the molded article from the web flashing that surrounds the article. The optical system then directs the laser beam to cut completely through the flashing in order to produce a cut-out article having a surface substantially free of flashing. These amendments are fully supported by the specification particularly at Paragraphs 2-3 and 26-34, and the originally filed claims. No new matter has been added to the application. Claims 6-7 have been amended so that they now are dependent on claim 8.

Rejections Under 35 U.S.C. §102

The Office Action first states that claims 1, 2, 4 and 6-7 are rejected under 35 U.S.C. §102(b) as being anticipated by Duley et al., U.S. Patent 4,933,205 ("Duley"). In reply, Applicant submits that Duley does not anticipate the present invention, as recited in amended claims 1, 2, 4, and 6-7 for the reasons discussed below.

First, as the Examiner recognizes, claims 1, 2, and 4 have been canceled, and claims 6-7 have been amended so that they now are ultimately dependent upon claim 8.

Turning to Duley, Applicant agrees with the Examiner that this reference discloses a method of forming a relief image on a foam plastic substrate using laser irradiation. The method involves applying a dry transfer ink composition to the surface of the foam substrate. The ink composition is applied to the substrate in the desired shape of the relief image to be formed. The composition may be applied to the substrate in the pattern of an o-ring seal or gasket. Then, the image of the composition is formed in relief on the substrate by irradiating the substrate with a laser beam. The sections of the substrate that are not coated with the composition are ablated at a faster rate than the

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sections that are coated. The resulting product is a foam substrate containing raised images of the desired articles as shown, for example, in FIG. 6b.

However, Duley does not disclose a process for laser-cutting a polymeric web material containing molded articles, wherein an optical system is used to locate the molded articles on the web material and distinguish the articles from the flashing that surrounds the articles as recited in the amended claims. (Claims 1-5 which did not recite an optical system have been canceled herein.) As described at Paragraphs 26-34 in the specification, the optical system is a key feature of the present invention. The optical system uses "vision" algorithms to detect the molded articles on the polymer web and identify the areas where the web flashing needs to be removed. Upon distinguishing the molded articles from the excess web flashing, the optical system instructs the laser to start cutting at specific flash junction locations. This precise cutting mechanism produces articles free of any flashing. No further de-flashing, de-burring, or other machine-tooling is required to remove the flashing from the molded article.

It is submitted that Duley does not disclose each and every element of amended claim 8 as required by an anticipatory reference. There is no disclosure or suggestion for using an optical system to guide the laser in Duley. Claims 1-5 have been canceled and claims 6-7 have been amended to make them dependent on amended claim 8. Accordingly, it respectfully is requested that the rejections of claims 1, 2, 4 and 6-7 (as amended) under 35 U.S.C. §102(b) be withdrawn.

Rejections Under 35 U.S.C. §103

The Office Action next states that claims 8, 9, 11 and 13-15 are rejected under 35 U.S.C. §103(a) as being unpatentable over Duley in view of Duffin, U.S. Patent 6,201,214 ("Duffin"). Applicant submits that the combination of Duley and Duffin does not render the present invention, as recited in amended claims 8, 9, 11 and 13-15, prima facie obvious.

As the Examiner points out, Duffin discloses a method of drilling holes through a workpiece using a laser with an in-line camera system. The camera uses auto-focusing techniques to move the laser nozzle over the workpiece. A hole in the workpiece then is drilled. According to Duffin, after each hole has been drilled, the same optical camera

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provides digital data to a controlling processor so that an assessment of the drilled hole can be made. The Examiner takes the position that it would have been obvious to a person of ordinary skill in the art to modify the laser-etching process in Duley by using an in-line camera system as described in Duffin.

However, Applicant submits that the combination of Duley and Duffin would not make the present invention obvious to a person of ordinary skill in the art, because there is no suggestion for the presently claimed optical system. Duffin teaches using a camera system to drill holes in a workpiece. There is no suggestion in Duffin for an optical system that is programmed to identify a molded article on the workpiece. Duffin is not interested in using an optical system to precisely identify shaped articles on the workpiece and distinguish them from surrounding flashing. The optical system in Duffin is used only to provide feedback on previously drilled holes so that new holes can be drilled:

Parameters such as diameter and circularity of the hole can be monitored, and optionally by using "best fit" digital processing techniques the characteristics of the drilled hole can be compared with those of an optimum desired drilled hole. (col. 3, lines 3-7).

Thus, the Duffin laser-drilling process is used to generate completely new products (i.e., holes in the workpiece), and the optical system provides data on previously drilled holes. Duffin fails to teach a process for laser-cutting flash that surrounds molded articles on a polymer web. In contrast to the holes produced by the process in Duffin, the molded articles (e.g., O-rings), which will be cut-out of Applicant's web, already have been produced. The molded articles already are shaped and formed. Applicant's laser is not used to generate or produce the articles but is used to cut the surrounding flash.

Even if the teachings in Duffin are combined with the teachings in Duley, there is no suggestion for using an optical system to distinguish a molded article on a web from the surrounding web flashing as recited in the amended claims. As discussed above, Duley teaches a completely different method for recognizing the shape of the O-ring on the foam substrate. In Duley, a dry transfer ink composition is applied to the surface of

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the foam in the shape of the O-ring, and the laser beam is directed onto the foam. The sections of the foam that are not coated with the composition are ablated at a faster rate than the sections that are coated. Duley provides no hint for using an optical system to recognize a molded article on a polymer web.

It respectfully is submitted that in view of the teachings in Duffin and Duley, a person of ordinary skill in the art could only construct the presently claimed invention in hindsight, and such a construction is improper.

Furthermore, Applicant's process uses the optical system to guide the laser beam during the cutting step. The camera provides real-time continuous feedback as to the shape of the article, while the laser beam cuts through the flashing of the polymeric web. The camera instructs the laser to adjust its cutting position as needed. This dynamic laser-cutting process is important, because the shapes of articles on elastomeric and other relatively soft polymeric webs change due to heat absorption generated by the laser. The heat forces the polymer to expand and/or retract, depending upon the geometry of the article. These shape variations in the polymer and resulting article are not acceptable when making precision parts. Thus, Applicant uses the optical system of the present invention as an "eye" for guiding the laser's cutting path and compensating for any shape variations in the polymer.

In view of the foregoing, it respectfully is submitted that the rejection of claims 8, 9, 11 and 13-15 be withdrawn.

Lastly, the Office Action states that claim 12 is rejected under 35 U.S.C. §103(a) as being unpatentable over Duley in view of Duffin and further in view of Narayan et al., U.S. Patent 6,559,196 ("Narayan"); and claim 5 is rejected under 35 U.S.C. §103(a) as being unpatentable over Duley in view of Narayan. As discussed above, Applicant believes that amended claim 8 is in condition for allowance. Claim 12 is ultimately dependent upon amended claim 8; thus, it is submitted that this claim also is in condition for allowance. Claim 5 has been canceled.

Further addressing the Examiner's citation of the Narayan reference, Narayan discloses polyurethane compositions made from low-VOC polyisocyanate and low-VOC hydrogen-containing components. These compositions can be poured into molds to form fire-resistant, non-precision parts. The composition reacts to form a foam product.

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However, there is no disclosure or suggestion in Narayan for a precision laser-cutting process as defined in the present invention.

Conclusion

In summary, Applicant submits that claims 1-15 (as amended) are patentable and each of the Examiner's rejections and objections has been overcome. Accordingly, Applicant respectfully requests favorable consideration and allowance of amended claims 1-15.

The Commissioner is hereby authorized to charge any additional fee required in connection with the filing of this paper or credit any overpayment to Deposit Account 02-0900. Should there be any outstanding matter that needs to be resolved in the present application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Respectfully submitted,

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